Maximal Phonation Time

This program allows to assess the laryngeal efficiency, i.e. the relation between the aerial energy emitted and the duration of the vocal production, indirectly estimating the glottis leakage (pneumophonatory quotient).

Principle

1. Recording of a sustained « a » until vocal extinction.
2. Four windows are displayed corresponding to the sound, the fundamental frequency (Hz), the intensity (dB), et and the oral airflow (dm^3/s).
3. Two cursors corresponding to the beginning and the end of the voiced signal appear automatically or manually. Calculations are performed between these two cursors.

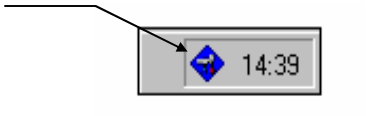
Preparation

Equipment

Complete version	Acoustic version
Place a disinfected mask on the mouthpiece. Choose a mask that will fit well with the patient face. Do not stretch too much the mask to avoid splitting the synthetic material	Place the patient at 30 cm from the on stand microphone. Ensure that he does not move
Turn the selector **INPUT 1-LEFT** on **MASK**	Turn the selector **INPUT 1-LEFT** on **MICRO**.

Software

Launch the SESANE software by clicking this icon in Windows task bar.



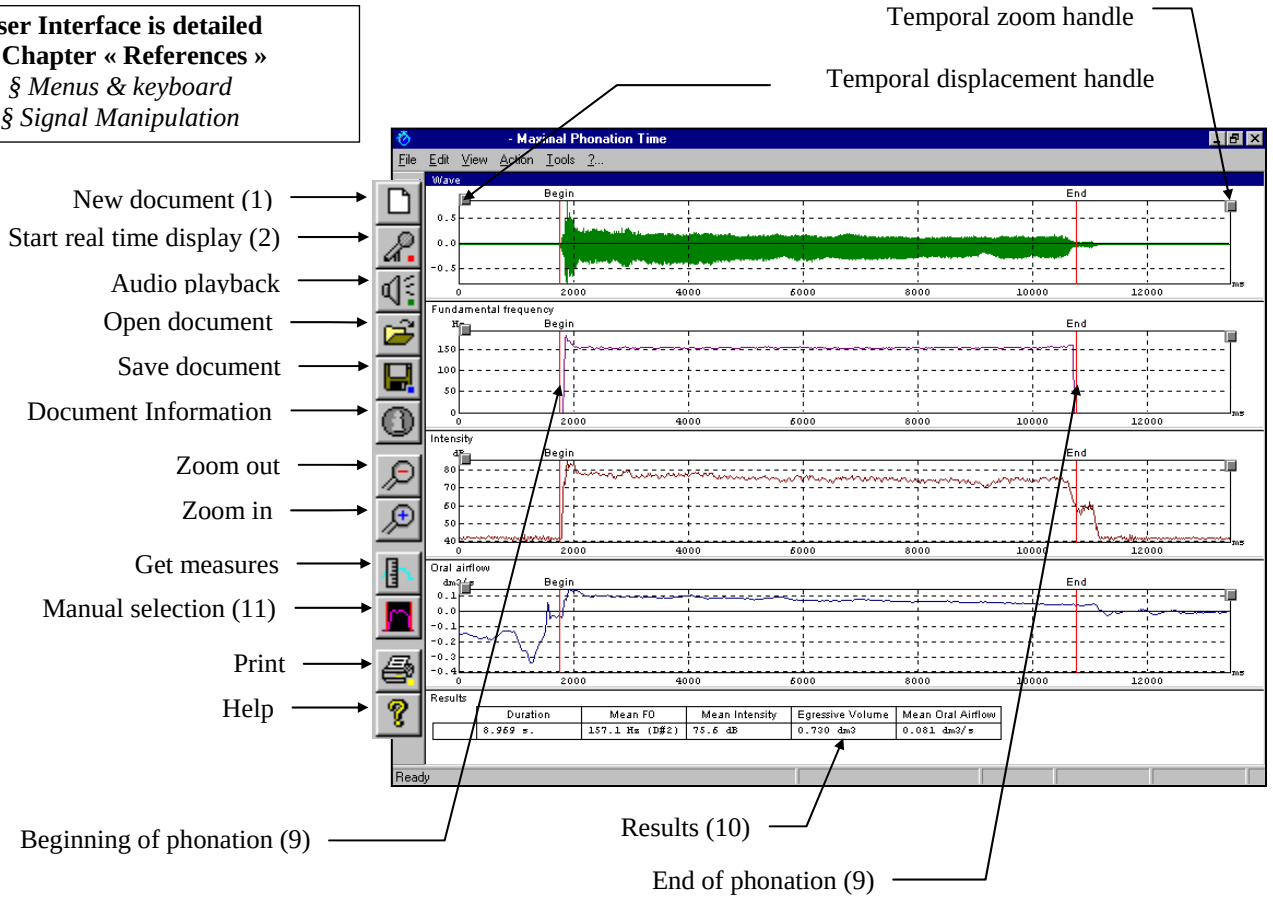
In SESANE, enter the patient information :

Then double click on this icon :

Using Maximal Phonation Time

Main Window

User Interface is detailed in Chapter « References »
§ Menus & keyboard
§ Signal Manipulation



Protocol

(1) Create a new document if necessary
(2) Start real time display.

The recording control window appears.

[EVA AERODYNAMIC]
Move away the patient from the mouthpiece.
(3) Calibrate the sensors, wait three seconds. *The airflow level must be at zero.* Replace the patient in position.

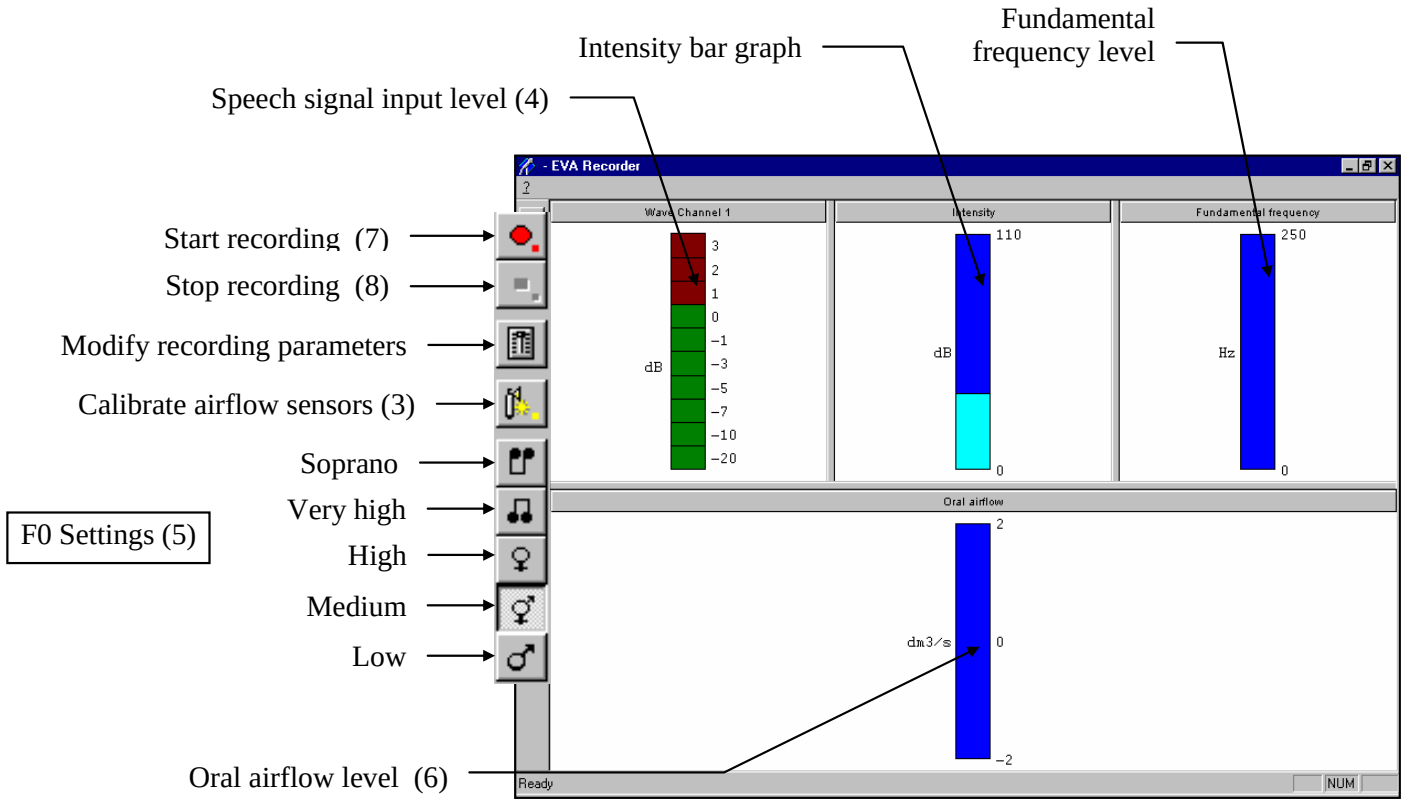
Make a try of a sustained « a » .
(4) Verify the recording level of the acoustic input vu-meter. Beware of not reaching +3 dB while recording. If necessary, adjust the volume button of INPUT 1-LEFT.
A low signal may indicate a bad position of the selector MASK - MICRO - LINE
(5) Set up the register of fundamental frequency depending on the patient tessitura.

[EVA AERODYNAMIC]
(6) Verify that the airflow level is correct. If necessary, verify that the patient is correctly pressed against the mask.

(7) Start recording.
The patient produces its longest sustained « a » at comfortable and usual pitch.
(8) Stop recording

The main window appears

Recording control window



9) Cursors showing the beginning and the end of the signal appear automatically. It is possible to move them if necessary. To do so :

- place the mouse pointer near the cursor
- click and hold down the left mouse button
- move the mouse to the right place
- release the mouse button

(10) Results appear in the array

(11) It is possible to select manually the maximal phonation time :

- select a zone (place the mouse pointer at the beginning, press and hold down the Shift key and left mouse button as well, move the mouse to the end, release)
- push down the icon (11)

One can detect automatically the maximal phonation time by using the menu Action | Automatic boundaries or by pressing the keyboard shortcut « A ».

Save the document.

Print the document.

Measurement

The Maximal Phonation Time assessment needs two cursors :

- beginning of phonation
- end of phonation

Boundaries

Automatic cursors

In a standard mode, phonation time is detected by automatic algorithm.

If necessary, you can call this automatic detection by selecting the Menu « Action | Automatic boundaries » or by using the keyboard accelerator « A ».

Manual cursors

You can set manually the boundaries. To do that,

- select a zone (place the mouse pointer at the beginning, press and hold down the Shift key + left mouse button, move the mouse until the end and release)
- press the icon 
- or select the menu « Action | Manual Selection »
- or use the keyboard accelerator « S »

You can move these cursors if necessary.
To do so,

- place the mouse pointer near the cursor
- click and hold down the left mouse button
- move the mouse where you want
- release the left button.

Measures displayed

The measures displayed in the array are:

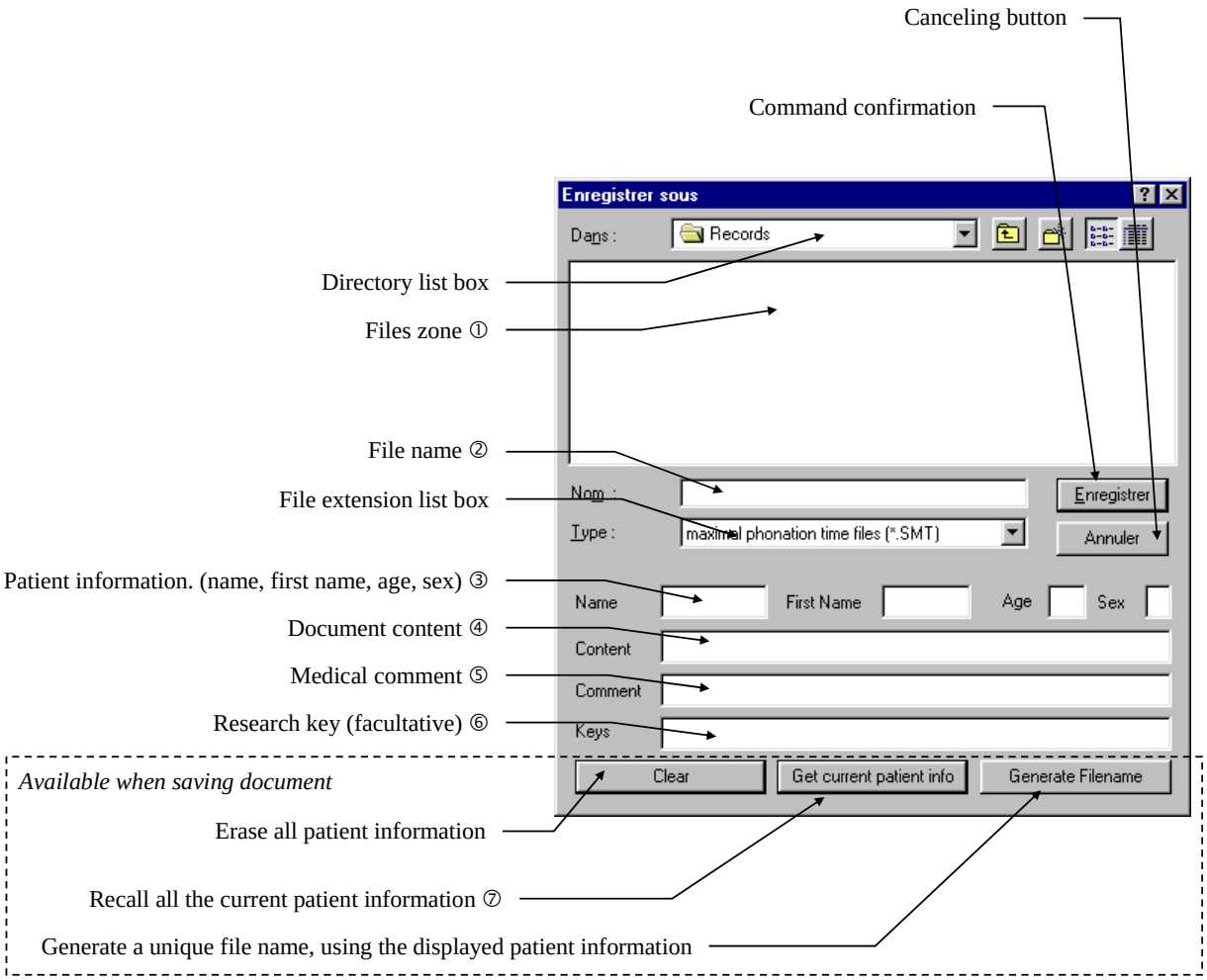
- the duration = maximal phonation time (in seconds)
- the mean F0 (in Hz and musical note)
- the mean intensity
- the mean oral airflow
- the volume expired

Note :

The Phonatory quotient is the ratio between the Vital Capacity (measured by spirometry technics) and the Maximal Phonation Time.

$$Phonatory\ Quotient(dm^3 / s) = \frac{Vital\ Capacity(dm^3)}{Maximal\ Phonation\ Time(s)}$$

Data Management



Save a document

Method 1 : Click on ⑦. *The current patient information appear in the fields ③, ④, ⑤, ⑥. A unique filename is automatically generated in ②.* Confirm by clicking on ⑨.

Method 2 : Enter manually the patient information in the fields ③, ④, ⑤, ⑥. Click on ⑧. *A unique filename appears in ②.* Confirm the saving by clicking on ⑨.

Method 3 : Enter manually the patient information in the fields ③, ④, ⑤, ⑥. Enter a file name in ①. Confirm the saving by clicking on ⑨.

Open a document

Select a document in ① by a single click with the left mouse button.. *The file name appears in ② with its information as well in ③, ④, ⑤ ⑥.* Confirm your choice by clicking on ⑨.

To obtain information about the current document

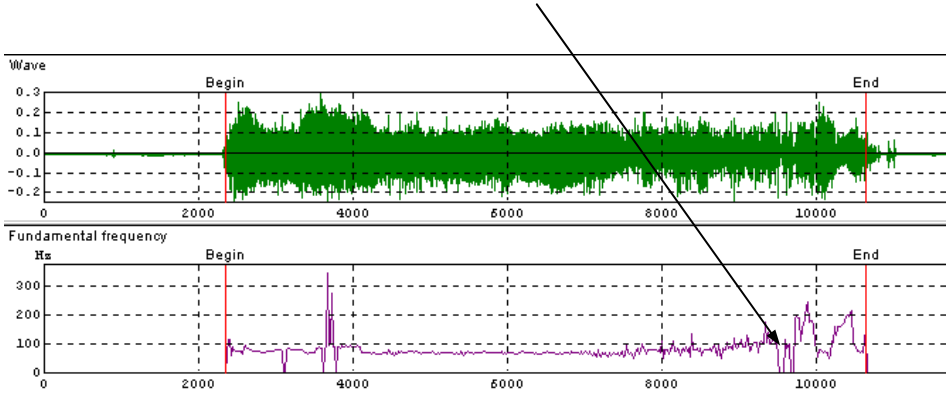
Options

You can modify the program parameters by selecting the menu « Tools | Options » or by typing the keyboard accelerator.« O ». You can also use the Object Menu « Properties » (right mouse button).

The specific options of this application are following.

Automatic boundaries settings

With severe voice disorders, some voice breaks can appear during the phonation.



These breaks can trouble the automatic boundaries algorithm: it can consider that a voice break is the end of the phonation, which is not necessary the case. To avoid such a problem, the algorithm does not take into account these breaks if they are short enough.

By calling the options, you can fix a value which is the maximal duration of the breaks.